ICAO ENGINE nvPM EMISSIONS DATA SHEET

SUBSONIC ENGINES

ENGINE IDENTIFICATION:	Trent XWB-79	BYPASS RATIO (-):	9.2
UNIQUE ID NUMBER:	01P18RR123	PRESSURE RATIO π_{oo} (-):	38.8
COMBUSTOR:	Phase5 Tiled		
ENGINE TYPE:	TF	RATED OUTPUT F_{oo} (kN):	355.2

REGULATORY DATA

CHARACTERISTIC VALUES:	LTO_{mass}/F_{oo} (mg/kN)	LTO_{num}/F_{oo} (particles/kN)	NVPM MASS CONCENTRATION ($\mu g/m^3$)
LTO/F_{oo} AND MAX $nvPM_{mass}$	166.4	2.03E+15	2619
AS % OF CAEP/10 LIMIT	-	-	68.9
AS % OF CAEP/11 LIMIT (InP)	47.9	48.6	
AS % OF CAEP/11 LIMIT (NT)	77.7	72.9	

MEASURED DATA

MODE	POWER SETTING ($\%F_{oo}$)	TIME minutes	FUEL FLOW kg/s	EMISSIONS INDICES* EI_{mass} (mg/kg)	EMISSIONS INDICES* EI_{num} (particles/kg)	NVPM MASS CONCENTRATION PEAK $nvPM_{mass}$ ($\mu g/m^3$)
TAKE-OFF	100	0.7	2.601	44.9	2.01E+14	
CLIMB OUT	85	2.2	2.129	73.3	3.51E+14	
APPROACH	30	4.0	0.755	87.4	9.83E+14	
IDLE	7	26.0	0.280	25.1	7.77E+14	
LTO TOTAL (kg, mg, number of particles)			1008	52336	6.38E+17	-
NUMBER OF ENGINES				3	3	3
NUMBER OF TESTS				4	4	4
AVERAGE LTO/F_{oo} VALUES (mg/kN, particles/kN)				147.4	1.80E+15	-
MAX EI VALUES (mg/kg, particles/kg) AND MAX MASS CONC.($\mu g/m^3$)				132.4	1.03E+15	2381

** Emissions Indices are corrected for thermophoretic loss and fuel hydrogen content*

DATA FOR EMISSIONS INVENTORIES (ESTIMATIONS FOR ENGINE EXIT PLANE VALUES)

MODE	POWER SETTING ($\%F_{oo}$)	CORRECTED EMISSIONS INDICES EI_{mass_SL} (mg/kg)	CORRECTED EMISSIONS INDICES EI_{num_SL} (particles/kg)
TAKE-OFF	100	48.8	2.94E+14
CLIMB OUT	85	80.2	5.76E+14
APPROACH	30	100.3	2.14E+15
IDLE	7	31.1	1.83E+15

AMBIENT CONDITIONS

	From	To
BAROMETER (kPa)	98.6	101.9
TEMPERATURE (K)	283.0	295.0
HUMIDITY (kg water/kg dry air)	0.0006	0.0096

FUEL

HEAT OF COMBUSTION (MJ/kg)	43.18
HYDROGEN CONTENT (%mass)	13.84
AROMATICS CONTENT (%vol)	16.8
NAPHTHALENE CONTENT(%vol)	1.23
SULPHUR CONTENT (ppm by mass)	373

MANUFACTURER:	Rolls-Royce plc
TEST ORGANIZATION:	Rolls-Royce plc
TEST LOCATION:	Derby
TEST DATES:	03/07/2014-08/12/2018

REMARKS

1. Certification report EDNS01000844195
2. The maximum EImass occurs between 30% and 85% Foo
3. The maximum EInum occurs between 30% and 85% Foo
4. Corrected peak EI number value (fuel correction) since EEDB v30